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5 Pollux Drive
Edwards AFB CA 93524-7048

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C.T. Liu (PRSM) et al., "Investigating the Crack Growth Behavior in a Particulate Composite Material under Multi-Axial Loading Condition" (abstract only)

9th Int'l Conf. on the Mechanical Behavior of Materials **(Statement A)**
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Investigating the Crack Growth Behavior in a Particulate Composite Material under Multi-Axial Loading Conditions

C. T. Liu
AFRL/PRSM
10 E. Saturn Blvd.
Edwards AFB CA 93524-7680, USA

M. Tam
The Aerospace Co.
El Segundo, CA 90250, USA

In past years, a considerable amount of work has been done studying crack growth behavior in particulate composite materials under different loading conditions at ambient pressure [1-4]. The basic approach used in characterizing the crack growth behavior in the particulate composite materials is based on linear elastic or linear viscoelastic fracture mechanics. Experimental findings indicate that power law relationships exist between the crack growth rate, da/dt, and the Mode I stress intensity factor, K_I. These experimental findings support the theory developed by Knauss [5] and Schapery [6] in their studies of crack growth behavior in linear viscoelastic materials. It is known that classical fracture mechanics principles, especially linear elastic fracture mechanics, are well established for single-phase materials. Experimental data indicate that linear fracture mechanics theories are applied to the particulate composite materials with varying degree of success. However, there has been relatively little effort in understanding the crack growth behavior in such materials under confining pressure condition.

In this study, pre-cracked specimens were used to study the crack growth behavior in a particulate composite material, containing hard particles embedded in a rubbery matrix, under constant strain conditions at 8697 KPa confining pressure. Three different applied strain levels, 12%, 15%, and 18%, were considered. In addition, the strain distributions near the crack tip were determined using imaging correlation techniques. The effects of strain levels on the crack growth behavior in the material were investigated and the results were discussed.

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